

SEQUENCE LISTING

<110> NORPHARMA SPA

<120> Recombinant bacterial strains for the production of
natural nucleosides and modified analogues thereof

<130> 99DC26E

<140> PCT/EP99/10416

<141> 1999-12-23

<150> MI98A002792

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<170> PatentIn Ver. 2.1

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<223> deoD

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<223> tetracycline resistance

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<220>

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<223> deoD

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<220>

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<222> (2229)..(3628)

<223> tetracycline resistance

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<212> DNA

<213> Artificial Sequence

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two proteins bonded to each other via an aa linker

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 tgccggcacc tgtcctacga gttgcatgat aaagaagaca gtcataagtg cggcgacgat 2940

| | | | | | | |
|-------------|------------|------------|------------|-------------|-------------|------|
| agtcattgcc | cgcgcccacc | ggaaggagct | gactgggttg | aaggctctca | agggcatcgg | 3000 |
| tgcagctctt | cccttatgcg | actcctgcat | taggaagcag | cccagtagta | ggttgaggcc | 3060 |
| gttgagcacc | gcccgcgcaa | ggaatggtgc | atgcaaggag | atggcgccca | acagtccccc | 3120 |
| ggccacgggg | cctgccacca | taccacagcc | gaaacaagcg | ctcatgagcc | cgaagtggcg | 3180 |
| agcccgatct | tcccatcggg | tgatgtcggc | gatataggcg | ccagcaaccg | cacctgtggc | 3240 |
| gcccgtgatg | ccggccacga | tgcgtccggc | gtagaggatc | cacaggacgg | gtgtggctgc | 3300 |
| catgatcggg | tagtcgatag | tggctccaag | tagcgaagcg | agcaggactg | ggcggcggcc | 3360 |
| aaagcggctg | gacagtgtct | cgagaacggg | tgcgcataga | aattgcatca | acgcatatag | 3420 |
| cgctagcagc | acgccatagt | gactggcgat | gctgtcggaa | tggacgatat | cccgcgaagag | 3480 |
| gcccggcagt | accggcataa | ccaagcctat | gcctacagca | tccagggtga | cgggtgcgag | 3540 |
| gatgacgatg | agcgcattgt | tagatttcat | acacggtgcc | tgactgcgtt | agcaatttaa | 3600 |
| ctgtgataaa | ctaccgcatt | aaagctcatg | cggatcagtg | agggtttgca | actgcgggtc | 3660 |
| aaggatcttg | atttcgatca | cggcacgata | atcgtgcggg | agggcaaggg | ctccaaggat | 3720 |
| cgggccttga | tgttaccgga | gagcttggca | cccagcctgc | gcgagcaggg | gaattgatcc | 3780 |
| gggtggatgac | cttttgaatg | acctttaata | gattatatta | ctaattaatt | ggggacccta | 3840 |
| gagggtccctt | tttttatitt | aaaaattttt | tcacaaaacg | gtttacaagc | ataaagcttg | 3900 |
| gcactggccg | tgtttttaca | acgtcgtgac | tgggaaaacc | ctggcggttac | ccaacttaat | 3960 |
| cgccttgtag | cacatccccc | tttcgccagc | tggcgtaata | gcgaagaggc | ccgcaccgat | 4020 |
| cgccttcccc | aacagttgcg | cagcctgaat | ggcgaatggc | gcctgatgcg | gtattttctc | 4080 |
| cttacgcata | tgtgcggtat | ttcacaccgc | atatggtgca | ctctcagtag | aatctgctct | 4140 |
| gatgccgcat | agttaagcca | gccccgacac | ccgccaacac | ccgctgacgc | gccctgacgg | 4200 |
| gcttgtctgc | tcccggcctc | cgcttacaga | caagctgtga | ccgtctccgg | gagctgcatg | 4260 |
| tgtcagaggt | tttcaccgtc | atcaccgaaa | cgcgcgagac | gaaagggcct | cgtgatacgc | 4320 |
| ctatttttat | aggttaatgt | catgataata | atgggtttct | agacgtcagg | tggcactttt | 4380 |
| cggggaaatg | tgcgcggaac | ccctattttg | ttattttttc | aaatacatte | aaatatgtat | 4440 |
| ccgctcatga | gacaataacc | ctgataaatg | cttcaataat | attgaaaaag | gaagagtatg | 4500 |
| agtattcaac | atttcctgtg | cgcctttatt | cccttttttg | cggcattttg | ccttcctgtt | 4560 |
| tttgcctacc | cagaaacgct | ggtgaaagta | aaagatgctg | aagatcagtt | gggtgcacga | 4620 |
| gtgggtttaca | tcgaactgga | tctcaacagc | ggtaagatcc | tigagagttt | tgcccccgaa | 4680 |
| gaacgttttc | caatgatgag | cactttttaa | gttctgctat | gtggcgcggt | attatcccg | 4740 |
| attgacgccg | ggcaagagca | actcggctgc | cgcatacact | attctcagaa | tgacttggtt | 4800 |
| gagtactcac | cagtcacaga | aaagcatctt | acggatggca | tgacagtaag | agaattatgc | 4860 |
| agtgtgccta | taaccatgag | tgataaacct | gcggccaact | tacttctgac | aacgatcgga | 4920 |
| ggaccgaagg | agctaaccgc | ttttttgcac | aacatggggg | atcatgtaac | tgccttgat | 4980 |
| cgttgggaac | cggagctgaa | tgaagccata | ccaaacgacg | agcgtgacac | cacgatgcct | 5040 |
| gtagcaatgg | caacaacggt | gcgcaaaact | ttaactggcg | aactacttac | tctagcttcc | 5100 |
| cggcaacaat | taatagactg | gatggaggcg | gataaagttg | caggaccact | tctgcgtcgc | 5160 |
| gcccttccgg | ctggctgggt | tattgtgtat | aaatctggag | ccggtgagcg | tgggtctcgc | 5220 |
| ggatatcattg | cagcactggg | gccagatggg | aagccctccc | gtatcgtagt | tatctacacg | 5280 |
| acggggagtc | aggcaactat | ggatgaacga | aatagacaga | tgcgtgagat | aggtgcctca | 5340 |
| ctgattaagc | attggtaact | gtcagaccaa | gtttactcat | atatacttta | gattgattta | 5400 |
| aaacttcatt | tttaatttaa | aaggatctag | gtgaagatcc | tttttgataa | tctcatgacc | 5460 |
| aaaatccctt | aacgtgagtt | ttcgttccac | tgagcgtcag | accccgtaga | aaagatcaaa | 5520 |
| ggatcttctt | gagatccttt | ttttctgcgc | gtaactgtgt | gcttgcaaac | aaaaaaacca | 5580 |
| ccgctaccag | cgggtggttg | tttgccggat | caagagctac | caactctttt | tcogaaggta | 5640 |
| actggcttca | gcagagcgca | gataccaaat | actgtccttc | tagttagacc | gtagttaggc | 5700 |
| caccacttca | agaactctgt | agcaaccgct | acatacctcg | ctctgctaatt | cctgttacca | 5760 |
| gtggctgctg | ccagtggcga | taagtcgtgt | cttaccgggt | tggactcaag | acgatagtta | 5820 |

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 tttcctgcgt tatccctga ttctgtggat aaccgtatta ccgcctttga gtgagctgat 6240
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<210> 11

<211> 2297

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: cloning vector
 derived from pUC18

<400> 11

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 agctcggtag ccggggatcc tctagagtcg aactgcaggc atgcaagctt atgggtgact 120
 ctacgtacaa tctgctctga tgccgcatag ttaagccagc cccgacaccc gccaacaccc 180
 gctgacgcgc cctgacgggc ttgtctgttc ccggcatccg cttacagaca agctgtgacc 240
 gtctccggga gctgcatgtg tcagaggttt tcaccgtcat caccgaaacg cgcgagacga 300
 aagggcctcg tgatacgctt atttttatag gttaatgtca tgataataat ggtttcttag 360
 acgtcaggtg gcacttttcg gggaaatgtg cgcggaaccc ctatttgttt atttttctaa 420
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 tgaaaaagga agagtatgag tattcaacat ttccgtgtcg cccttattcc cttttttgcg 540
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 gatcagttgg gtgcacgagt gggttacatc gaactggatc tcaacagcgg taagatcctt 660
 gagagttttc gcccgaaga acgttttcca atgatgagca cttttaaaagt tctgctatgt 720
 ggcgcggtat tatcccgat tgacgcgggg caagagcaac tcggtcgccg catacactat 780
 tctcagaatg acttggttga gtactcacca gtcacagaaa agcatcttac ggatggcatg 840
 acagtaagag aattatgcag tgctgccata accatgagtg ataacactgc ggccaactta 900
 cttctgacaa cgatcggagg accgaaggag ctaaccgctt ttttgacaa catgggggat 960
 catgtaactc gccttgatcg ttgggaaccg gagctgaatg aagccatacc aaacgacgag 1020
 cgtgacacca cgatgcctgt agcaatggca acaacgttgc gcaaactatt aactggcgaa 1080
 ctacttactc tagcttcccg gcaacaatta atagactgga tggaggcgga taaagttgca 1140
 ggaccacttc tgogctcggc ccttcgggct ggctggttta ttgctgataa atctggagcc 1200
 ggtgagcgtg ggtctcggcg tatcattgca gcaactgggc cagatggtaa gccctcccgt 1260
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 cccgtagaaa agatcaaagg atcttcttga gatccttttt ttctgcgcgt aatctgctgc 1560
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 ccttttgctc acatgttctt tcttgcgtta tcccctgatt ctgtggataa cegtattacc 2220
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 agcgaggaag cggaaga 2297

<210> 12

<211> 3031

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: udp and deoD
 cloned into pGM746 without upstream ptac promoter

<400> 12

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 agctcggtac ccggggatcc tagcaggagg gaattcttcc atggctaacc cacacattaa 120
 tgcagaaatg ggcgatttcg ctgacgtagt tttgatgccg ggcgacccgc tgcgtgcgaa 180
 gtatattgct gaaactttcc ttgaagatgc ccgtgaagtg aacaacgttc gcggtatgct 240
 gggcttcacc ggtacttaca aaggccgcaa aatttcogta atgggtcacg gtatgggtat 300
 cccgtcctgc tccatctaca ccaaagaact gatcaccgat ttccggcgtga agaaaattat 360
 ccgctgggtt tctgtggcg cagttctgcc gcacgtaaaa ctgcgcgacg tctttatcgg 420
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 cgctatcgct gacttcgaca tgggtgcgtaa cgcagtagat gcagctaaag cactgggtat 540
 tgatgctcgc gtgggtaacc tgttctccgc tgacctgttc tactctccgg acggcgaaat 600
 gttcgacgtg atggaaaaat acggcattct cggcgtggaa atggaagcgg ctggtatcta 660
 cggcgtcgct gcagaatttg gcgcgaaagc cctgaccatc tgcaccgat ctgaccacat 720
 ccgcactcac gagcagacca ctgccgtga gcgtcagact accttcaacg acatgatcaa 780
 aatgcactg gaatccgttc tgcgtggcga taaagagtaa gtcgacctgc aggcattgcaa 840
 gcttatggtg cactctcagt acaatctgct ctgatgccgc atagttaagc cagccccgac 900
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 aagttctgct atgtggcgcg gtattatccc gtattgacgc cgggcaagag caactcggtc 1500

gcgcataca ctattctcag aatgacttgg ttgagtactc accagtcaca gaaaagcatc 1560
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 cggtaagcgg cagggtcggg acaggagagc gcacgaggga gcttccaggg ggaaacgcct 2760
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 gctcgtcagg ggggcggagc ctatggaaaa acgccagcaa cgcggccttt ttacggttcc 2880
 tggccttttg ctggcctttt gctcacatgt tctttcctgc gttatccctt gattctgtgg 2940
 ataaccgtat taccgccttt gagtgagctg ataccgctcg ccgcagccga acgaccgagc 3000
 gcagcgagtc agtgagcgag gaagcggaag a 3031

<210> 13

<211> 3128

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: deoD cloned
downstream ptac promoter

<400> 13

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 tcggctcgta taatgtgtgg aattgtgagc ggataacaat ttcacacagg aggatcctag 180
 caggagggaa ttcttccatg gctacccccc acattaatgc agaaatgggc gatttcgctg 240
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 aagatgcccg tgaagtgaac aaggttcgog gtatgctggg cttcaccggg acttacaaag 360
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 aagaactgat caccgatttc gggtgaaga aaattatccg cgtgggttcc tgtggcgcag 480
 ttctgcgcga cgtaaaactg cgggaagtcg ttatcggtat ggggtgctgc accgattcca 540
 aagttaacgg catccgtttt aaagaaccatg actttgcccg tatcgtgac ttgcacatgg 600

| | | | | | | |
|-------------|-------------|------------|-------------|-------------|-------------|------|
| tgcgtaacgc | agtagatgca | gctaaagcac | tgggtattga | tgctcgctg | ggtaacctgt | 660 |
| tctccgctga | cctgtttctac | tctccggacg | gcgaaatgtt | cgacgtgatg | gaaaaatacg | 720 |
| gcatttctcg | cgtggaaatg | gaagcggctg | gtatctacgg | cgctcgctgca | gaatttggcg | 780 |
| cgaaagccct | gaccatctgc | accgtatctg | accacatccg | cactcacgag | cagaccactg | 840 |
| ccgctgagcg | tcagactacc | ttcaacgaca | tgatcaaaat | cgcaactggaa | tccgtttctgc | 900 |
| tgggcgataa | agagtaagtc | gacctgcagg | catgcaagct | tatggtgcac | tctcagtaca | 960 |
| atctgctctg | atgccgcata | gttaagccag | ccccgacacc | cgccaacacc | cgctgacgcg | 1020 |
| ccctgacggg | cttgtctgct | cccgccatcc | gcttacagac | aagctgtgac | cgtctccggg | 1080 |
| agctgcatgt | gtcagagggt | ttcacctgca | tcaccgaaac | gcgcgagacg | aaagggcctc | 1140 |
| gtgatacgcc | tatttttata | ggtaaatgtc | atgataataa | tggttttctta | gacgtcaggt | 1200 |
| ggcacttttc | ggggaaatgt | gcgcggaacc | cctatttgtt | tatttttcta | aatacattca | 1260 |
| aatatgtatc | cgctcatgag | acaataaccc | tgataaatgc | ttcaataata | ttgaaaaagg | 1320 |
| aagagtatga | gtattcaaca | tttccgtgtc | gcccttattc | ccttttttgc | ggcatttttgc | 1380 |
| cttcctgttt | ttgctcacc | agaaacgctg | gtgaaagtaa | aagatgctga | agatcagttg | 1440 |
| ggtgcacgag | tgggttacat | cgaactggat | ctcaacagcg | gtaagatcct | tgagagtttt | 1500 |
| cgccccgaag | aacgttttcc | aatgatgagc | actttttaaag | ttctgctatg | tggcgcggtg | 1560 |
| ttatcccgtg | ttgacgcg | gcaagagcaa | ctcggtcgcc | gcatacacta | ttctcagaat | 1620 |
| gacttggttg | agtactcacc | agtcacagaa | aagcatctta | cggtatggcat | gacagtaaga | 1680 |
| gaattatgca | gtgctgccat | aaccatgagt | gataacactg | cggccaaactt | acttctgaca | 1740 |
| acgatcggag | gaccgaagga | gctaaccgct | tttttgacac | acatggggga | tcagttaact | 1800 |
| cgcccttgatc | gttggaacc | ggagctgaat | gaagccatac | caaacgacga | gcgtgacacc | 1860 |
| acgatgcctg | tagcaatggc | aacaacgttg | cgcaaaactat | taactggcga | actacttact | 1920 |
| ctagcttccc | ggcaacaatt | aatagactgg | atggaggcgg | ataaagttgc | aggaccactt | 1980 |
| ctgcgctcgg | cccttccggc | tggctggttt | attgctgata | aatctggagc | cggtgagcgt | 2040 |
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<211> 3934

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: udp and deoD
cloned downstream ptac promoter

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<212> DNA

<213> Artificial Sequence

<220>

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cloned downstream ptac promoter

<400> 15

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